

Studies on Cynipidae Alloxystinae

1. The identity of *Alloxysta rubriceps* (Kieffer, 1902), with some general remarks on the subfamily

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In the past few years I have obtained a rather large number of Cynipidae as hyperparasites from the mealy plum aphid, *Hyalopterus pruni* (F.), through the primary Aphidiid parasite *Praon volucre* (Hal.). I reared them from several localities in the Netherlands, both on the primary host plant of the aphid, the plum (*Prunus domestica*), and on the secondary host plant, the reed (*Phragmites communis*). Except for one single specimen the Cynipids belong undoubtedly to one species.

It is not difficult to identify this species as *Charips pruni* Hedicke, the description by HEDICKE (1928) being clear enough, in combination with his statement that it was reared from *Hyalopterus pruni*. This Cynipid leads me to some remarks which might be of general interest for the study of this group of parasitic Hymenoptera in which taxonomy and nomenclature seem very complicated.

HEDICKE mentions that in the fore wing of *Charips pruni* the costal vein — he writes "Subcosta" — by which the radial cell is closed, is at the distal end only faintly pigmented or not pigmented at all, so that the cell seems only half closed. However, whether the radial cell is closed — and the costal vein partially unpigmented — or whether it is open seems to me to be a matter of view. With a low magnification the cell appears to be closed. However with a magnification of $\times 75$ with a binocular I do not see any trace of a costal vein. The consequence is then that the species should be transferred from the genus *Charips* Haliday, 1870, to the genus *Alloxysta* Förster, 1869.

Since DALLA TORRE and KIEFFER (1910) published their work on world Cynipidae, *Charips* and *Alloxysta* have been generally accepted at the rank of genera. HELLÉN (1931), however, has drawn attention to the fact that the only difference between them consists in the radial cell being closed or open. A number of *Alloxysta* species have a partially closed cell and there may be even some intraspecific variation in this respect. I think HELLÉN is right in referring *Alloxysta* and *Charips* to one genus, which should then be named *Alloxysta* Förster. The subfamily name, formerly Charipinae Dalla Torre and Kieffer, 1910, should then be Alloxystinae Hellén, 1931. Though the suggestions by HELLÉN are no doubt sound from a taxonomic and nomenclatorial point of view, they have not been followed in more recent lists and taxonomic works on Cynipidae (MUESEBECK et al., 1951; WELD, 1952; KROMBEIN, 1958; IONESCU, 1969).

In later work HELLÉN (1963) proposed a classification of the Finnish species of Alloxystinae in three genera: *Dilyta*, *Phaenoglyphis* and *Alloxysta*. These names were used originally by FÖRSTER (1869). Though I do not agree with the concepts of several of the species mentioned by HELLÉN, I consider his generic classification the best we have at present. These genera are essentially the same as

already intended by THOMSON (1877) with *Glyptoxysta*, *Auloxysta* and *Allotria*, respectively. Though for more detailed data on taxonomy and nomenclature the publications of HELLÉN (1931, 1958a, b, 1963) should be consulted, it seems useful to mention the characteristics of the three genera as accepted by this latter author.

Alloxysta Förster, 1869. Type-species *Xystus macrophadnus* Hartig, 1840, by original designation.

The two apical antennal segments separate. Mesoscutum and mesopleura without longitudinal furrows. Scutellum without groove or pits at the base. Second abdominal segment dorsally as long as or only little longer than the third. Abdomen truncated at the apex.

Phaenoglyphis Förster, 1869. Type-species *Phaenoglyphis xanthochroa* Förster, 1869, by original designation. The two apical antennal segments separate. Mesoscutum with or without parapsidal furrows. Mesopleura each with a longitudinal furrow. Scutellum with a groove or with two pits at the base. Second abdominal segment dorsally much longer than the third. Abdomen truncated at the apex.

Dilyta Förster, 1869. Type-species *Dilyta subclavata* Förster, 1869, by original designation. The two apical antennal segments connate. Mesoscutum and mesopleura without longitudinal furrows. Scutellum without groove or pits at the base. Second and third abdominal segments fused, constituting the whole abdomen behind the petiolus. Abdomen rounded at the apex.

Over a number of years I have reared many Alloxystinae species from aphid mummies. Two facts have struck me especially. In the first place in many species there seems to exist a characteristic combination of aphid host, primary Aphidiid parasite and Alloxystine hyperparasite. In the second place in many species there exist constant, often very striking differences in colour distribution between males and females. Both facts, as far as I can see, are either overlooked or insufficiently considered in taxonomic literature. This is not surprising because by far the most species, even in recent times, have been described from specimens captured in the field and only relatively few from specimens that were reared.

Today there exist about 200 available names for the species of Alloxystinae, mainly from Europe, to a lesser extent from Northern America, and only a few from other parts of the world. I consider that these numbers constitute only a small part of the species really existing, even in Europe. The genus *Alloxysta* Förster sensu HELLÉN, contains the largest number of species which are very similar and difficult to distinguish. So it is evident that identification, based on the usually very short descriptions mainly of colour characteristics, must have caused a tremendous confusion in the past. The same holds for associating the males and females of each species, which often occurred only on the basis of their similarity in colour. This is essentially wrong. As the keys in the works of KIEFFER (1902b) and DALLA TORRE and KIEFFER (1910) are in fact based on the very incomplete descriptions of the earlier authors, reliable identification with these keys is impossible.

The male of *Alloxysta pruni* (Hedicke), when identified with the key of DALLA TORRE and KIEFFER (1910), would run to *Alloxysta erythrothorax* (Hartig). DALLA TORRE and KIEFFER mention two "subspecies", *Alloxysta*

erythrothorax erythrothorax (Hartig) and *Alloxysta erythrothorax dubia* Kieffer. For both "subspecies" *Aphis pruni* F. (= *Hyalopterus pruni* (F.)) is mentioned as the host. For the second "subspecies" there is also the record "aus einer Aphide auf *Phragmites communis*", which aphid is certainly *Hyalopterus pruni* too. There is no doubt that *Alloxysta erythrothorax*, as regarded by DALLA TORRE and KIEFFER, is the same species as *Alloxysta pruni* (Hedicke).

Now the question arises: Is *Alloxysta erythrothorax*, as regarded by DALLA TORRE and KIEFFER, the same species as *Xystus erythrothorax* Hartig, 1840? The very short original description of HARTIG fits exactly the male of *Alloxysta pruni*: "niger, capite rufo, facie flava, pectore rufo, antennis pedibusque rufis. ♂ Long. lin. 1/2". However, HARTIG states it to be reared "Aus der schwarzen Pflaumen-Blattlaus", which aphid is not *Hyalopterus pruni*.

I was so fortunate to have on loan the original Alloxystinae material of HARTIG from the "Zoologische Sammlung des Bayerischen Staates" at Munich (West Germany) through the courtesy of Mr. E. DILLER. In this collection there is one pin, with a label bearing the name „erythrothorax m". Unfortunately the insects have been lost from the two triangular cardboards. However, the pin contains a piece of a dry, brown leaf, apparently of plum, on which a black aphid mummy has been glued. Dr. D. HILLE RIS LAMBERS, Bennekom, the Netherlands, informed me that the mummy almost surely belongs to the aphid *Rhopalosiphum nymphaeae* (L.). To the right of the pin is another pin without a label. On it, there is an *Alloxysta* specimen, glued on a white triangular piece of cardboard, which must have been regarded as belonging to the same species. It is, however, not *Alloxysta pruni*. Yet I am not quite certain that it is *Xystus erythrothorax* Hartig, because it is a female; the colours too do not exactly fit the description by HARTIG.

Rhopalosiphum nymphaeae seems only rarely to be found on plum and some other *Prunus* species, its primary host plants. As yet I have not succeeded in finding black mummies of this aphid on *Prunus* species in the field and until I do I withhold definite judgment whether *Xystus erythrothorax* Hartig must be considered the same species as *Alloxysta pruni* (Hedicke). I think, however, that this is very unlikely.

As to the "subspecies" *erythrothorax* and *dubia* I have to make the following remarks. The latter "subspecies" was originally described by KIEFFER (1902a) from the male¹) as a "variety" of the nominal species. KIEFFER's interpretation of the nominal species was based on the description of the female by GIRAUD (1860). This latter author states: "Je ne connais que la femelle, mais je crois pouvoir la rapporter avec certitude au mâle décrit par Mr. HARTIG, qui ne diffère que par la couleur jaunâtre de la face. Selon cet auteur il provient des *Aphis* qui vivent sur le prunier". This is an example of how reckless the earlier authors were in identifying Alloxystinae specimens and in joining males and females. Furthermore the identity of the aphid named "schwarze Pflaumen-Blattlaus" by HARTIG was replaced by the general indication "des *Aphis* qui vivent sur le prunier" by GIRAUD. KIEFFER (1902b) is thus wrong in stating "obtenu d'*Aphis pruni* [= *Hyalopterus pruni* (F.)] par HARTIG". Certainly GIRAUD's female of

¹) DALLA TORRE and KIEFFER (1910) are wrong in citing ♀ & ♂ (p. 257).

Alloxysta erythrothorax is not the same species as *Alloxysta pruni*. It seems that later on GIRAUD reared what he thought to be *Allotria erythrothorax* (Hartig). LABOULBÈNE (1877) published a list of insects, reared by GIRAUD, after the death of this entomologist. In this list *Allotria erythrothorax* is mentioned to be reared from "*Aphis sur Prunus*". It is puzzling to know what GIRAUD really obtained. If the aphid was *Hyalopterus pruni*, he reared surely one or more male specimens of *Alloxysta pruni*.

It is not easy to decide from the original description of *Alloxysta erythrothorax* Hart. var. *dubia* n. var. ♂ (KIEFFER, 1902a) what is the exact difference from the nominal species. In ANDRÉ: *Spécies des Hyménoptères d'Europe et d'Algérie*, Tome 7 bis (KIEFFER, 1902b), where var. *dubia* is once more indicated as "n. var.", KIEFFER writes: "L'insecte sur lequel j'établis la var. *dubia* diffère de celui qu'a décrit GIRAUD, par la coloration du thorax qui est rouge avec tout le dessus d'un brun marron". This fits exactly for the male of *Alloxysta pruni*. So it may be taken for granted that the description of the nominal species *Alloxysta erythrothorax* (Hartig), given by KIEFFER (1902b) and DALLA TORRE and KIEFFER (1910), is due to a false interpretation and that *Alloxysta erythrothorax dubia* Kieffer is synonymous with *Alloxysta pruni* (Hedicke).

If the descriptions of *Alloxysta erythrothorax* (Hartig) and *Alloxysta erythrothorax dubia* Kieffer in "Das Tierreich" (DALLA TORRE and KIEFFER, 1910, pp. 257 and 258) are compared, there seem to exist rather important differences in the relative lengths of the antennal segments and in the radial cell. One might wonder why both subspecies were not regarded as quite different species. This would have been more logical. There must be some mistake in the description of the antennae in the "subspecies" *dubia*. These are recorded as being as long as the body. However, segments 3—5 are described as only twice as long as thick, the distal segments being still shorter. The antennae, after this description, would be unusually thick for an *Alloxysta* species.

It is interesting that in his "Supplément aux Cynipides", which appeared in a later part of "Spécies des Hyménoptères d'Europe et d'Algérie, Tome 7 bis" (1904, p. 596), KIEFFER seems to have seen himself what he considered to be the nominal species *Alloxysta erythrothorax* ♂ and ♀. On this additional description it is clear once more that he attached too much importance to the similarity in colour in both sexes. He describes, however, differences in the shape of the radial cell in the male and in the female. Needless to say that KIEFFER's description on p. 596 (1904) can be best disregarded.

As already mentioned, the female of *Alloxysta pruni* differs in the distribution of the colours considerably from the male. These colour differences have already been described by HEDICKE (1928). If the radial cell is accepted as being closed, a dark female specimen would run to *Charips rubriceps* (Kieffer) in the key of DALLA TORRE and KIEFFER (1910). The original description of KIEFFER (1902a) fits the female of *Alloxysta pruni* (Hedicke). KIEFFER gives some data about the host, which are most complete in his work of 1902b: "Moeurs et patrie: Obtenu par M. Carpentier d'un Coccide blanc et hémisphérique, fixé aux feuilles de *Phragmites communis* L. France". In his original description (1902a) the locality is more exactly defined as "Amiens". As far as I know such a coccid on the leaves

of *Phragmites communis* does not exist in Western Europe. It often happens in *Praon volucre*, from which the full-grown larva spins a white, more or less hemispherical cocon beneath the dead parasitized aphid host, that the aphid mummy is lost. This seems, according to my experience, especially to occur with mummies on *Phragmites communis*. Mr. CARPENTIER must have been mistaken in considering this cocoon as a coccid. There is no doubt that *Allotria rubriceps* Kieffer, 1902, is the female of *Alloxysta pruni*.

This demonstrates how false host records may appear in literature. As far as I know Alloxystinae are exclusively hyperparasites of aphids through Aphidiidae as primary parasites. FULMEK (1943) in his list of parasites of aleyrodids and coccids mentions three Alloxystinae species as parasites of coccids, which are also recorded in the work of DALLA TORRA and KIEFFER (1910). As I have shown, the record of *Allotria rubriceps* is incorrect; the two others are no doubt wrong too. FULMEK mentions "*Alloxysta erythrothorax* Htg. var. *dubia*" — this is wrongly cited, it must be the nominal species — and "*Xystus erythrocephalus* Htg." (synonymous with *Alloxysta victrix* (Westw.)) as parasites of *Aulacaspis rosae* (Bouché). FULMEK suggests that the three species (he writes "4 Arten", p. 2) might be actually hyperparasites of Diptera, which is of course incorrect.

In this paper I have tried to explain how complicated taxonomic and nomenclatorial matters may be in Cynipidae Alloxystinae. There are at least three available names for the hyperparasitic *Alloxysta* species from *Hyalopterus pruni* through *Praon volucre*. It may turn out later on, when all types of the earlier authors have been studied, that an older synonym exists which should be used. These studies will, no doubt, still take a very long time. I think that for the benefit of investigations in the field of ecology and applied entomology it would be better to use in the meantime a justified, generally accepted name, than to wait until all nomenclatorial puzzles have been elucidated. Otherwise several different names might be used by different specialists for the same species using the existing poor key, e.g. of DALLA TORRE and KIEFFER (1910). *Charips cameroni* Dalla Torre, mentioned by DILL (1937) as being reared as a hyperparasite from *Hyalopterus arundinis* (F.) [= *H. pruni* (F.)] in Switzerland, is no doubt an example of such a misidentification. It is surely the same species as discussed in this paper. The unidentified Cynipid species reared by BEIRNE (1943) from *Hyalopterus pruni* through *Praon volucre* in Ireland, must also be considered as the same species.

In respect to the valid name of the *Alloxysta* species, mentioned in this paper, the following available names have been discussed:

Alloxysta dubia Kieffer

Alloxysta erythrothorax var. *dubia* Kieffer, 1902, *Bull. Soc. Hist. nat. Metz* 2 Sér., 10 v., 22 cah., p. 10.

Alloxysta rubriceps (Kieffer)

Allotria rubriceps Kieffer, 1902, *Bull. Soc. Hist. nat. Metz*. 2 Sér., 10 v., 22 cah., p. 14.

Alloxysta pruni (Hedicke)

Charips pruni Hedicke, 1928, *Verh. Ver. naturw. Unterb. Hamb.* 19, 1926-27 (1928), p. 94—95.

Though of the first two names which appeared in the same publication, *Alloxysta dubia* has position precedence, I select *Alloxysta rubriceps* in accordance with Recommendation 24A of the International Code of Zoological Nomenclature (1964) because of the questionable significance of the first name. So the species should be named: *Alloxysta rubriceps* (Kieffer).

It is evident that the characteristics, used until today, are insufficient in differentiating the numerous Alloxystinae species. In order to find characteristics that are more reliable, I made microscopical preparations of specimens belonging to a number of species. The slides were prepared according to the method described by HILLE RIS LAMBERS (1950). I dissected the insects in a drop of chloralphenol and transferred the parts to BERLESE's mounting medium. When comparing the corresponding parts of different species, it seemed to me that there are only very few morphological characteristics that may be used in establishing the identity of a species in this subfamily. I venture to give the following description of the colours — of dried specimens — in both sexes, in addition to figures of the fore wing, the antennae and the propodeum.

The shape and the size of the radial cell in the fore wing belong to the morphological characteristics that have most generally been used in distinguishing the species of Alloxystinae. Also the relative lengths of the antennal segments have much been considered. Figures of the fore wing and of the antennae (Figs. 1, 2 and 3) will show the characteristics better than a description in words.

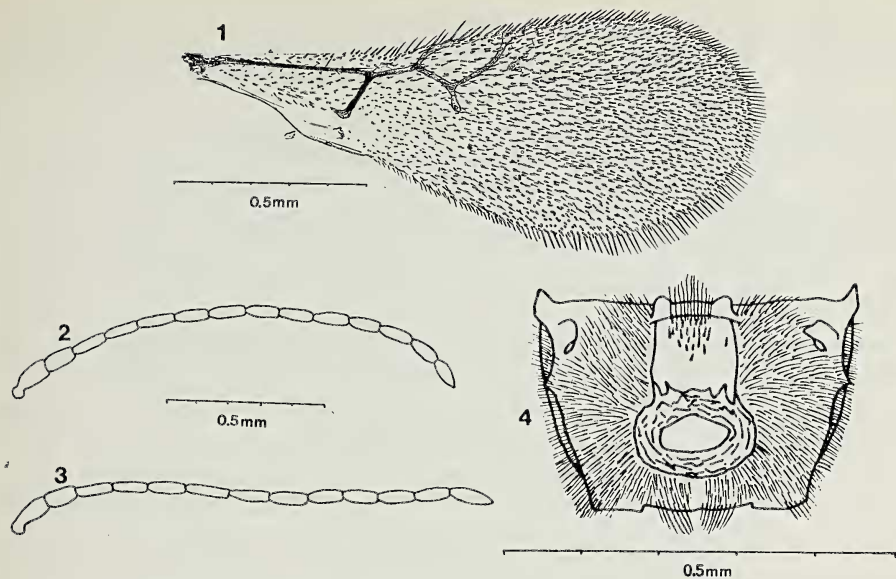
In taxonomic work on Alloxystinae hardly any attention has been paid to the propodeum. Yet I think that it is very important in distinguishing the species. *Alloxysta rubriceps* has two longitudinal keels on the propodeum (Fig. 4). Other species, e.g. *Alloxysta victrix* (Westwood, 1833), do not have keels, while *Alloxysta gautieri* Kieffer, 1922, has four keels. The shape of the keels and the kind and disposition of the hairs may prove to be good characteristics too.

Till yet I did not find other characteristics that are sufficiently constant. Despite this I think that the description and the figures will enable the species to be recognized.

Alloxysta rubriceps (Kieffer)

Male: Head above the insertion of the antennae light red yellow, beneath light yellow, antennae entirely yellow, sometimes distally red yellow. Thorax light red yellow, small middle part of pronotum and propodeum somewhat dark; mesoscutum black, scutellum black above. Legs light yellow, distal ends of last tarsal segments dark with black claws. Wings hyaline with dirty yellow veins. Abdomen black, base sometimes a little red brown.

Female: Head as in male; first four antennal segments light yellow, the fifth a little darker, the following light brown. Thorax black, pronotum at least laterally lighter. In the lighter specimens there is a tendency for the upper part



Alloxysta rubriceps (Kieffer). Fig. 1. Fore wing (♂, ♀). Fig. 2. Antenna (♂) (hairs and other details omitted). Fig. 3. Antenna (♀) (hairs and other details omitted). Fig. 4. Propodeum (♂, ♀).

of the mesopleura and the propodeum to be lighter. Legs light yellow, last tarsal segments more or less dark with black claws. Wings and abdomen as in males.

Length: male and female 1.1—1.4 mm.

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Summary

I have investigated the identity of a Cynipid species that has been commonly reared as a hyperparasite from *Hyaloapterus pruni* (Hemiptera, Aphididae).

I propose to follow HELLÉN (1931, 1963) in incorporating the genus *Charips* Haliday, 1870, into the genus *Alloxysta* Förster, 1869. The subfamily name Charipinae Dalla Torre & Kieffer, 1910, should be changed into Alloxystinae Hellén, 1931.

Three available names for the species in question are discussed: *Alloxysta dubia* Kieffer, 1902, *Alloxysta rubriceps* (Kieffer, 1902) and *Alloxysta pruni* (Hedicke, 1928). I indicate the second to be the valid name.

I established the names by comparing the original descriptions and by data on the hosts, which I regard as very important.

Though reliable species characteristics seem to be scarce in the subfamily, I have tried to redescribe *Alloxysta rubriceps*.

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Rhyacionia pinicolana Doubleday (Lep., Tortricidae). In 1968 bewaarde de heer J. LUKIEN te Ruurlo enkele microlepidoptera, die bij hem op zijn vanglamp verschenen waren. Daarbij was ook een exemplaar van *R. pinicolana*, wat dus een nieuwe vindplaats voor de soort betekent. BENTINCK en DIAKONOFF geven als vliegtijd: juni en juli (De Nederlandse Bladrollers: 104, 1968). Dat de vliegtijd veel langer kan duren, blijkt wel uit de vangdatum van het Ruurlose exemplaar: 28.VIII.

Hetzelfde geldt trouwens voor de veel gewonere *Rhyacionia buoliana* Denis & Schiffermüller. Ook voor deze soort geven genoemde auteurs als vliegtijd juni en juli. Maar de collectie van het Zoölogisch Museum te Amsterdam bevat verschillende exemplaren uit augustus, tot nu toe als laatste vangst 20.VIII.1968 te Bergeijk (VAN WISSELINGH leg.).

Mooie gekleurde afbeeldingen van de voorvleugels (en de genitaliën) van beide soorten, die ook in Spanje bleken voor te komen, geeft R. AGENJO in *Bol. Serv. Plagas Forestales* 4, Pl. I, 1961. — LPK.